DISTRICT OF COLUMBIA
PUBLIC SCHOOLS

Cover Page for 5th Grade Math Scope and Sequence

The purpose of this document is to clarify the intentions of this Scope and Sequence (SAS) and to provide a window into the thinking behind the choices made. If you have further questions, concerns, and/or ideas, please reach out to Camsie McAdams, Director of STEM. We are excited to make our math work exemplary throughout the district!

PLEASE NOTE THAT STANDARDS APPEARING IN BOLD IN THE SAS DOCUMENTS ARE CONSIDERED MAJOR FOCUS STANDARDS (guidance from PARCC).

1. **What is our main focus in each unit?**

Unit 1.1 – Patterns, Patterns Everywhere: the use of logic and basic computation to identify or create ordered pairs

Unit 1.2 – Plotting Patterns: introduction to the coordinate plane; plotting points on a coordinate plane to display data visually

Unit 2.1 – Less than One/Greater than One: place value to the thousandths (conceptual development)

Unit 2.2 – Show Me the Number: writing quantities in multiple formats (the composition and decomposition of numbers to the thousandths place); conceptual development of exponential form

Unit 2.3 – Count it up: development of computational skills of a multi-digit number (addition, subtraction, multiplication and division of numbers with two decimal places)

Unit 3.1 – From 2D to 3D: characteristics of geometric shapes including the characteristic of volume for 3 dimensional shapes

Unit 3.2 – Defining Division: connecting fractions to the concept of division

Unit 3.3—Fraction Computation: Multiplication and division of fractions

Unit 4.1—More Computations: Addition and subtraction of fractions with unlike denominators

Unit 5.1—Strategic re-teaching and Review: based on student data, prepare students for the DC CAS

Unit 6.1 – Bridge: fractions and equivalency

2. **Why are we starting with number patterns and displaying data when fractions and the "base ten" number system are so critical at this grade level?**

At the onset of the school year, we want our students getting a broader sense of how to make sense of their world–through identifying, describing, creating and extending number patterns, students begin to develop a deeper understanding of number relationships and the multiple connections that exist among and between the computational operations of addition, subtraction, multiplication and division. Using data generated by the class

and community is a natural way to provide this context. The CCSS-M may be a shift for educators and students alike, so providing the time and space to really think conceptually about math content and build our language to support a strong mathematics classroom is important.

3. **Why are we teaching multiplication and division of fractions before addition and subtraction of fractions?**

In the CCSS-M, the concept of computing fractions is a primary focus for 5th grade. Addition and subtraction of fractions is conceptually more difficult than multiplying and dividing fractions because of the required prerequisites of being able to identify equivalent fractions, identifying the common denominator for two or more fractions with unlike denominators and converting improper fractions to mixed numbers. All of these prerequisites require proficiency with multiplication and division. For this reason multiplication and division of fractions is explored before addition and subtraction of fractions. Students will enter 5th grade with experience in adding and subtracting fractions with like denominators from 4th grade and will build on it this year with fractions with unlike denominators.

4. **What am I supposed to teach and do in unit 5.1?**

Unit 5 is meant to be a 10-day focused reviewing and re-teaching opportunity to help students feel prepared for success on the DC CAS. Use the data you have gathered about your students' understanding (journals, anecdotal records, PIA data, in-class quizzes, etc..) to strategically plan ways to address your students' needs. Incorporating whole group re-teaching as well as small-group and individualized instruction should comprise your instructional plan during this window.

5. **What am I supposed to teach and do in unit 6.1?**

The sixth instructional window is meant to be a bridge from one grade level to the next. We have selected some of the priority standards from this grade and linked them to similar standards in the upcoming one so that we are preparing our students for their next steps. Additionally, this is the time to really ensure all students have mastered the fluency standards and the major foci for this grade level.

6. **How can I incorporate the routine/fluency standards since they happen throughout the year?**

Fluently computing with all four operations, as well as identifying patterns in numbers are skills you can incorporate in daily morning meetings or morning/math messages. For example, having a "Mental Math Minute," encouraging students to mentally compute using a combination of operations, will allow students to develop this fluency. Children will also develop this fluency through repeated exposure, practice, and discussion. Allowing students to also make up examples of mental math for the class is another way to incorporate this skill in a fun practice.

7. **How can I incorporate the Standards for Mathematical Practice and why are only 2-3 underlined in each Instructional Unit?**

While the Standards for Mathematical Practice are not necessarily content-specific, we felt that some were better aligned to each unit. These standards should drive your pedagogical work every day. They are "habits of mind" that permeate the way we think and act on a daily basis. We recommend naming these with your students (although putting them in kid-friendly language may help at this age), so that the standards become part of your classroom's norms.

8. **What role does assessment play in my math instruction?**

Formative (on-going) assessments are an important part of instruction at every grade level. We strongly encourage you to take anecdotal notes on what your students are doing, saying, figuring out, and moving towards on a daily basis (at least for a few students per day). Building this type of work into your practice as a routine will make it seem less daunting and will also provide you with valuable information to inform your instruction – whether it be for your class, for a small group, or for individual students.

9. **What does it really mean to have "real world applications"? Can I just use word problems in my instruction?**

This is an interesting question! We encourage you to have conversations with colleagues about "school math" versus "real world" applications. Are we writing word problems for word problems' sake or are we really asking students to apply concepts at a deeper level? For example, giving students the problem, "It took Jake 10 minutes to fill 2 fish tanks and 20 minutes to fill 4 fish tanks, how long will it take him to fill 6 fish tanks?" is more of a "school math" problem. We may not need to figure this out in our "real life". However, to assess student understanding in a real-life scenario of this same application, we may conduct an experiment tracking the water flow, in gallons per minute, from different faucets in the school/in student homes. Use of that data will engage students in "real-world" problem solving.

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SY 2012-2013 Grade 5 CCSSM Math Scope and Sequence

First Instructional Window	Instructional Units	Common Core State Standards for Mathematical Content For each instructional window, instruction should focus on these standards as they will be assessed on the interim assessment. Order of standards is intentional.
August 27 – October 11 Paced Interim Assessment: October 10th, 11th Instructional Days: 32 (including testing)	**1.1 Patterns, Patterns Everywhere** Approximate number of instructional days: 30	**5. G.1.** Use a pair of perpendicular number lines, called axis, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., **x**-axis and **x**-coordinate, **y**-axis and **y**-coordinate). **5. G.2.** Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. **5. OA.3** Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example*, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so. **5. MD.2.** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.* **Routine/Fluency Standards:** **5. NBT.5.** Fluently multiply multi-digit whole numbers using the standard algorithm.

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		Standards for Mathematical Practice: *Note: These standards should drive your pedagogical practice every day. The underlined standards are critical ones for this unit.* 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

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Second Instructional Window	Instructional Units	Common Core State Standards for Mathematical Content For each instructional window, instruction should focus on these standards as they will be assessed on the interim assessment. Order of standards is intentional.
October 12 – December 5 Paced Interim Assessment: December 4th, 5th Instructional Days: 34 (including testing)	**2.1 Less than One/Greater than One (Understanding quantities greater than and less than 1)** Approximate number of instructional days: 8 days	**5. NBT.1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.** **5. NBT.3. Read, write, and compare decimals to thousandths.** **a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).** **b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.** **5. NBT.4. Use place value understanding to round decimals to any place.** **5. MD.1.** Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
	2.2 Show Me the Number (Reading and expressing numbers using multiple formats) Approximate number of instructional days: 8 days	**5. NBT.2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.** **5. OA.1.** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. **5. OA.2.** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example*, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product. **5. MD.1.** Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

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	2.3 Count it Up (Calculating quantities) Approximate number of instructional days: 16 days	**5. NBT.5. Fluently multiply multi-digit whole numbers using the standard algorithm.** **5. NBT.6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.** **5. NBT.7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.** **5. OA.1.** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. **5. OA.2.** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example*, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.
		Routine/Fluency Standards: **5. NBT.5.** Fluently multiply multi-digit whole numbers using the standard algorithm.
		Standards for Mathematical Practice: *Note: These standards should drive your pedagogical practice every day. The underlined standards are critical ones for this unit.* 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

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Third Instructional Window	Instructional Units	Common Core State Standards for Mathematical Content For each instructional window, instruction should focus on these standards as they will be assessed on the interim assessment. Order of standards is intentional.
December 6 – February 6 Paced Interim Assessment: February 5th, 6th Instructional Days: 33 (including testing)	**3.1 What's in a Shape, From 2D to 3D** Approximate number of instructional days: 11 days (before winter break)	**5. G.3.** Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles. **5. G.4.** Classify two-dimensional figures in a hierarchy based on properties. **5. MD.3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.** **a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.** **b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.** **5. MD.4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.** **5. MD.5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.** **a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.** **b. Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.** **c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.**

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	3.2 Defining Division Approximate number of instructional days: 5 days (after winter break)	**5. NF.3. Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?**
	3.3 Fraction Computation—Multiplying & Dividing Fractions Approximate number of instructional days: 15 days (after winter break)	**5. NF.4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.** **a. Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)** **5.NF.5 Interpret multiplication as scaling (resizing) by** **a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.** **b. Explaining why multiplying a given number a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying given a number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (nx)/(nxb) to the effect of multiplying a/b by 1.** **5. NF.7 Apply and extend previous understandings of division to divide units fractions by whole numbers and whole numbers by unit fractions.** **a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.** **b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.**

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		Routine /Fluency Standards: **5. NBT.5.** Fluently multiply multi-digit whole numbers using the standard algorithm.
		Standards for Mathematical Practice: *Note: These standards should drive your pedagogical practice every day. The underlined standards are critical ones for this unit.* 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

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Fourth Instructional Window	Instructional Units	Common Core State Standards for Mathematical Content For each instructional window, instruction should focus on these standards as they will be assessed on the interim assessment. Order of standards is intentional.
February 7 – March 29 Paced Interim Assessment: March 27th, 28th Instructional Days: 34 (including testing)	**4.1 More Computations—Addition and Subtraction of Fractions** Approximate number of instructional days: 32	**5. NF.1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)** **5. NF.2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.** **5. NF.6 Solve real world problems involving multiplication of fractions and mixed numbers, (e.g., by using visual fraction models or equations to represent the problem).** **5. NF.7 Apply and extend previous understandings of division to divide units fractions by whole numbers and whole numbers by unit fractions.** **c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?** **5. MD.2.** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example*, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.
		Routine/Fluency Standards: **5. NBT.5. Fluently multiply multi-digit whole numbers using the standard algorithm.**

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		Standards for Mathematical Practice: *Note: These standards should drive your pedagogical practice every day. The underlined standards are critical ones for this unit.* 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

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Fifth Instructional Window	Instructional Units	Common Core State Standards for Mathematical Content For each instructional window, instruction should focus on these standards as they will be assessed on the interim assessment. Order of standards is intentional.
April 8 to May 3 **DC-CAS April 22-May 2** Instructional Days: 18	**5.1 Strategic Re-teaching and Review**	Identified standards based on PIA data and other sources.

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Sixth Instructional Window	Instructional Units	Common Core State Standards for Mathematical Content For each instructional window, instruction should focus on these standards as they will be assessed on the interim assessment. Order of standards is intentional.
May 6 to June 20 Paced Interim Assessment: June 5th, 6th Instructional Days: 32	**6.1 Major Focus Standards and Bridge to 6th Grade** **Developing a Deeper Understanding of Fractions** Approximate number of instructional days: 30	**5. NF.3 Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example*, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie? *(This is a review standard)*** **5. NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. *For example*, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)** **6. RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*** **6. NS.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi? Compute fluently with multi-digit numbers and find common factors and multiples.***